NYSDEC SITE ID #36003

Draft
Quality Assurance
Project Plan

for the

Magna Metals Site

Town of Cortlandt
Westchester County, New York

Prepared by

EBASCO

An ENSERCH® Engineering and Construction Company

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DRAFT
QUALITY ASSURANCE
PROJECT PLAN

MAGNA METALS SITE
TOWN OF CORTLANDT,
WESTCHESTER COUNTY, NEW YORK

APRIL 1991

Approved by:

_____ Project Manager

_____ Quality Assurance Manager

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MAGNA METALS SITE
QUALITY ASSURANCE PROJECT PLAN

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QUALITY ASSURANCE PROJECT PLAN

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Ebasco Services Incorporated has been contracted to perform a Remedial Investigation/Feasibility Study (RI/FS) at the Magna Metals Site, in the Town of Cortlandt, Westchester County, New York. The data quality objectives of the RI/FS are to:

- Delineate the leach pit/septic tank, surface soil, subsurface soil, surface water and sediment contamination on site, if any;
- Delineate the groundwater contamination on site, if any;
- Obtain data to support a public health risk assessment; and
- Obtain data to evaluate remedial alternatives.

The field investigation will consist of the following subtasks:

1. Leach Pits/Septic Tank Sampling
2. Surface Water Sampling
3. Sediment Sampling
4. Surface Soil Sampling
5. Monitoring Well Installation and Subsurface Soil Sampling
6. Groundwater Sampling
7. Permeability Testing
8. Topographic and Sample Location Survey

Hittman-Ebasco Laboratories will perform all analytical services.

1.2 QUALITY ASSURANCE PROJECT PLAN

The Quality Management Plan presents the proper procedures for sample collection, handling, and chain-of-custody; analytical procedures; and documentation of all sampling and analytical activities.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Implementation of the Quality Management Plan requires that the Project staff be cognizant of the procedures and goals of the project. QA/QC responsibilities lie with the Project Manager, the Quality Assurance Manager, and other supervising personnel assigned to the Project.

The Project Manager

The Project Manager is the focal point of contact with the client for all contractual matters and is responsible for the overall conduct of the Project.

The Field Operations Leader

The Field Operations Leader reports to the Project Manager and is responsible for all activities at the site.

The Quality Assurance Manager

The Quality Assurance Manager has the responsibility for implementing the Quality Assurance Project Plan. The Quality Assurance Manager shall conduct audits on a regular basis to assure the Approved Plan is being implemented. Written reports shall be issued and follow-up made to assure closure of deficiencies.

3.0 QUALITY ASSURANCE OBJECTIVES

The Quality Assurance objective for measurement of data is to ensure that environmental data of known and acceptable quality are provided. The Quality Assurance objectives for data from the analysis of the environmental samples collected will include precision, accuracy, representativeness, comparability and completeness.

Precision: The Laboratory objective for precision is to equal or exceed the precision demonstrated for these samples on similar samples, and shall be within the established control limits for the methods, as published by the Environmental Protection Agency (EPA).

Accuracy: The Laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for these analytical methods on similar samples, and shall be within the established control limits for the methods as published by EPA.

Representativeness: Representativeness is a quality characteristic which is attributable to the type and number of samples to be taken of the medium and the analysis to be performed on the sample so as to be representative of the medium/environment (e.g., soil) at the site. Representativeness of samples will be ensured through the preparation of a detailed Field Sampling Plan.

Comparability: The sampling method employed in the site program, the chain-of-custody methods responsible for the transfer of the sampled items to the analytical laboratory and the analytical techniques implemented at the laboratory shall be performed in a uniform manner.

Completeness: The completeness of the data reflects that all the required samples have been taken and requisite analysis performed so as to generate an adequate data base to successfully conduct the work assignment.

4.0 SAMPLING PROCEDURES

4.1 GENERAL

The specific methods and techniques to be utilized in performing sampling are contained in the Field Sampling Plan (FSP), which identifies the procedures to be used for sample collection. The rationale for sample locations and frequency can be found in the RI/FS Work Plan.

4.2 SAMPLING PROCEDURES

A description of the sampling procedures to be utilized at the site is provided in the FSP. This document includes location, media to be sampled, sample methodology, preservation, and sample documentation and control.

All sample collection procedures shall be consistent with applicable EPA guidelines, unless otherwise specified.

4.3 BLANKS

4.3.1 Field Blanks

Field blanks shall be used to indicate if possible contamination is present on the collection media or has occurred in the sampling technique. Field blank frequency and field blank analysis will be as specified in the FSP.

4.3.2 Laboratory Blanks

Laboratory blanks shall be run to ensure contamination does not occur during the analytical procedure. The frequency and methods shall be addressed in the procedures of the analytical laboratory.

4.3.3 Trip Blanks

Trip blanks indicate whether sample contamination is due to contamination incurred during transport to the analytical laboratory. Frequency and analytical techniques shall be described in the FSP.

4.4 DUPLICATES

Selected media as described in the FSP shall be sampled in duplicate. The duplicate samples shall be analyzed at the frequency specified in the FSP. The duplicate analysis shall be used to indicate the precision of the sampling and analytical methods.

4.5 SPIKED SAMPLES

Samples shall be spiked by the laboratory with known quantities of the target compounds to determine the percent recovery and to indicate the accuracy of the methods. The frequency and analysis shall be described in the Quality Assurance programs of the analytical laboratory.

4.6 SAMPLE PRESERVATION

It is the objective of sample preservation to maintain the integrity of the samples collected from the time of collection until the analyses are performed. The samples, therefore, shall be preserved during storage and transportation to prevent or retard migration, degradation, or modification of the chemicals collected on the sample media. Samples shall be preserved as described in the FSP.

5.0 SAMPLE CUSTODY

The history of each sample and its handling shall be documented from its collection through all transfers of custody until it is transferred to an analytical laboratory. The laboratory shall maintain an internal custody form to document its handling from receipt to its final disposition.

A sample is considered to be in a person's custody if:

- It is in one's actual physical possession;
- It is in one's view, after being in one's physical possession;
- It is in one's physical possession and locked or otherwise sealed so that tampering will be evident; or
- It is kept in a secure area, restricted to authorized personnel only.

5.1 SAMPLE

A "sample" is physical evidence collected from a facility or the environment. An essential part of this collection process is the control of the evidence (i.e., sample) gathered from the facility or environment. To accomplish this, sample identification and chain of custody procedures shall be followed.

5.2 SAMPLE IDENTIFICATION

The method of identification of a sample depends on the type of measurement or analysis performed. When on-site measurements are made, the data shall be recorded directly in logbooks or in Field Data records with identifying information (project code, station numbers, station location, date, time, samplers), field observations, and remarks. Examples of on-site measurements include: pH, temperature, conductivity, flow measurements, and continuous air monitoring.

These samples shall be removed and transported from the sample location to a laboratory or other location for analysis. Each sample container shall be identified by a sample label. The information recorded on the sample label includes:

Project Name	(As described in PSSAP)
Sample Number	(As described in PSSAP)
Date	(Julian Calendar)
Time	(A four-digit number indicating the 24-hour time of collection - for example: 0954 is 9:54 am and 1629 is 4:29 pm)
Location	
Type of Analysis	(Analyses to be performed)
Preservation Notes	(Types of chemical preservatives added)

Sampling Technician	(Name of the sampler)
Media	(i.e., soil, air, etc.)
Sample Type	(Grab, split, composite)
Remarks	(Pertinent observations of the samplers)
Lab #	(May be completed by the receiving laboratory)

The sample labels are attached to each sample or container. If the sample is to be split, it shall be allocated into similar sample containers. Identical information shall be completed on each label and one label shall be marked "split".

After collection, separation, identification, and preservation, the sample shall be maintained under chain-of-custody procedures until it is in the custody of the analytical laboratory.

5.3 SAMPLE PRESERVATION

Sample preservation is important to prevent the degradation or modification of chemicals in samples during transportation and storage. Sample preservation methods shall be consistent with EPA requirements.

5.4 CHAIN-OF-CUSTODY PROCEDURES

All samples collected shall be traceable from the time the samples are collected until they or their derived data are used in the final report. In order to maintain and document sample possession, the following chain-of-custody procedure shall be implemented.

5.4.1 Field Custody Procedures

Samples shall be collected as described in the FSP.

- The field sampler is personally responsible for the care and custody of the samples collected until they are properly transferred or dispatched.
- When photographs are taken of the sampling as part of the documentation procedure, the name of the photographer, date, time, site location and site description shall be entered sequentially in the photographic logbook as photos are taken. Once developed the photographic prints shall be serially numbered corresponding to the logbook descriptions.
- Sample labels shall be completed for each sample, using waterproof ink unless prohibited by weather conditions, e.g., a logbook notation would explain that a pencil was used to fill out the sample label because a ballpoint pen would not function in freezing weather.
- The Site Manager determines whether proper custody procedures were followed during the field work and decides if additional samples are required.

5.4.2 Transfer of Custody and Shipment

Samples are accompanied by a Chain-of-Custody Record. When transferring the possession of samples, the individuals relinquishing and receiving shall sign, date, and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person (e.g., Federal Express), to the analyst in the laboratory.

Samples will be packaged properly for shipment and dispatched to the laboratory for analysis, with a separate custody record accompanying each shipment (e.g., one for samples shipped, driven, or otherwise transported to the laboratory). Shipping containers shall be padlocked or sealed for shipment to the laboratory. The method of shipment, courier name(s), and other pertinent information shall be entered in the "Remarks" section on the custody record.

All shipments shall be accompanied by the Chain-of-Custody Record identifying its contents. The original Record shall accompany the shipment, and the copy shall be retained by the Site Manager or his designee.

If sent by mail, the package shall be registered with return receipt requested. If sent by common carrier or air freight, proper documentation must be maintained.

5.4.3 Laboratory Custody Procedures

The Quality Assurance Manual of the Analytical Laboratory shall contain details of Laboratory Custody Procedures. The Laboratory Manual shall address:

- A designated sample custodian shall accept custody of the shipped samples and verify that the information on the sample labels matches that on the Chain-of-Custody Records. Pertinent information as to shipment, pickup, courier, etc., shall be entered in the "Remarks" section. The custodian then enters the sample label data into the sample tracking system of the laboratory. This system shall use the sample label number or assign a unique laboratory number to each sample label and shall assure that all samples are transferred to the proper analyst or stored in the appropriate secure area.

- Samples shall be distributed to the appropriate analysts as described in laboratory procedures. Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian.

- When sample analyses and necessary quality assurance checks have been completed in the laboratory, the unused portion of the sample and the sample container must be disposed of properly. All identifying tags, data sheets, chain-of-custody and laboratory records shall be retained as part of the permanent documentation. (Samples received by the laboratory shall be retained until analyses and quality assurance checks are completed.)

6.0 ANALYTICAL PROCEDURES

6.1 BACKGROUND

For each measurement parameter, including all pollutant measurement systems, Standard Operating Procedures (SOP) will be used when applicable.

The analytical methods, both qualitative and quantitative, implemented at an analytical laboratory, including mobile analytical laboratories, shall be reviewed and approved by the responsible Ebasco Quality Assurance Manager prior to use in project activities. The methods will be submitted in a format which will describe in detail the exact procedures and materials required to analyze the samples. The following items will be included in the procedure:

- Medium of Application (i.e., water, soil, air)
- Principle of Method
- Sample size requirements
- Detection limits
- Interferences and Corrective Measures
- Apparatus (including instrumental parameters)
- Reagents
- Calibration procedure
- Sample preparation (i.e., extraction, digestion)
- Diagrams or tables that describe the method
- Step-by-step analytical procedure
- Details of calculation
- Quality Control requirements (i.e., blanks, spikes, duplicates)
- Report requirements
- Reference

Data will be included, if appropriate, to support the limitations and the applicability of the method.

If at any time a change in the documented procedure is required, then the Ebasco Quality Assurance Manager shall examine and evaluate the significance of the change. If the change/modification is determined to be significant, the Quality Assurance Manager shall then require additional precision, accuracy and detection limit data either to demonstrate that the previous estimates of the limitations are still valid or to develop the necessary data for accuracy describing the new method. EPA guidelines for acceptance of alternative methods shall be followed.

6.2 SPECIFIC ANALYTICAL CHEMICAL PROCEDURES

The detailed analytical chemical and quality control procedures employed at the analytical laboratory shall be included in the operations procedures manuals of the laboratory contracted for the work assignment. These procedures shall be described in the Standard Operating Procedures for the laboratory and shall be EPA approved procedures. These procedures shall be used as the basis for performing audits of laboratory practices and reviewing laboratory results.

6.3 CONTROL OF TESTING

The laboratory program for controlling the testing of field samples (quality assurance) shall be described in the laboratories' procedures manuals.

6.4 LIMIT OF DETECTION

Limits of detection for the analytical laboratories shall be described in the standard operating procedures for each analytical method.

7.0 DATA REDUCTION, VALIDATION AND REPORTING

7.1 DATA REDUCTION

7.1.1 Definition

Data reduction frequently includes computation of summary statistics and their standard errors, confidence intervals, test of hypothesis relative to the parameters, and model validation. Statistically acceptable procedures, such as the procedures presented in Section 8.0, shall be used.

7.1.2 Data Collection

The data collected at the site may include, but not be limited to, pH, temperature, conductivity, etc., and shall be recorded in log books.

7.1.3 Data Usage

The data generated at site and/or in the laboratory shall be used to satisfy the project requirements. The equations and the typical calculation sequence which is followed to reduce the data to the acceptable format shall be described in the final report for the project.

7.1.4 Background Data

Background data produced for internal records and not reported as part of the analytical data could include the following: laboratory worksheets, laboratory notebooks, sample tracking system forms, instrument logs, standards records, maintenance records, calibration records, and associated quality control. These sources shall be available for inspection during audits, to determine the validity of data.

7.2 DATA VALIDATION

An independent review of field and laboratory documentation systems shall be performed as described in Section 10.0. The following items shall be reviewed to validate the data:

- Sampling procedures employed at site;
- Sample holding times;
- Documentation that the analytical results are within the control limits;
- Documentation that data and calculations were checked by the supervisor who was not involved in the performance of sampling, analysis or data reduction;
- Documentation that a final review of the data was made by the laboratory manager for correctness and validity of the data;

- Calibration of methods and instruments;
- Routine instrument checks (noise levels, drift, linearity, etc.);
- Documentation on traceability of instrument standards, samples, and data;
- Documentation on analytical methodology and QC methodology;
- Results of performance audits with appropriate audit materials;
- The control for interference contaminants in analytical methods (use of reference blanks and check standards for method accuracy and precision);
- Documentation of routine maintenance activity to ensure analytical reliability;
- Documentation of sample preservation and transport; and
- Documentation of inventory control of chemicals and items used for testing, e.g., shelf life.

The Lead Quality Assurance Person at the laboratory shall be responsible for data validation.

7.3 REPORTING

7.3.1 Contents of Report

As a minimum, laboratory reports to present data shall contain the following information:

- Title and Location of the Project;
- Project Identification Number;
- Name of the Report;
- Date Report was Prepared;
- Name, Address and Telephone Number of the Contractor;
- Sample Identification Number;
- Name and Location of Sample;
- Type of Sample (water, soil, waste, air);
- Date on which analysis was performed;
- Any special observations, circumstances or comments which may be relevant for interpretation of the data; and
- The signature of the Laboratory Manager.

Each parameter tested shall include: name of parameter, EPA approved testing procedure references, results of analysis, and the units of the reported results.

7.4 RECORDS

It shall be the responsibility of the Project Manager to maintain records in accordance with the requirements of this section until such time as those records are turned over for storage.

The records to be generated shall be determined by the Project Manager, Field Operations Leader, Corporate Industrial Hygienist, and Site Health and Safety Officer prior to the start of work.

Record of field activities which will support the integrity of samples shall be entered on bound and numbered pages. Such records shall be dated and signed or otherwise authenticated on the day of entry.

Records retained on file shall be indexed. The indexing system shall include as a minimum the location of records within the indexing system (which shall be in alphabetical, chronological or numerical order, or as otherwise indicated in written procedures).

There shall be sufficient information in the records to permit identification between the record and the item(s) or activity to which it applies and traceability of the records.

The records storage system shall provide for accurate retrieval of records without undue delay.

8.0 DATA PRECISION, ACCURACY AND COMPLETENESS

8.1 DEFINITION OF THE TERMS

8.1.1 Samples

A group of units or portion of material, taken from a larger collection of units or quantity of material, which serves to provide information that can be used as a basis for judging the quality of the larger quantity as a basis for action on the larger quantity.

8.1.2 Data Quality

The totality of features and characteristics of data that bears on its ability to satisfy a given purpose. The characteristics of major importance are accuracy, precision, completeness, representativeness and comparability.

8.1.3 Accuracy

The degree of agreement of a measurement (or an average of measurements of the same thing), X, with an accepted reference or true value, T, usually expressed as the difference between the two values, X-T, or the difference as a percentage of the reference or true value, 100 x (X-T)/T, and sometimes expressed as a ratio, X/T. Accuracy is a measure of the bias in a system.

8.1.4 Bias

The error in a method which systematically distorts results. The term is used interchangeably with accuracy in that bias is a measure of inaccuracy.

8.1.5 Relative Error

The mean error of a series of test results as a percentage of the true result.

8.1.6 Precision

The degree of mutual agreement among individual measurements of the same thing. Relative to a method of test, precision is the degree of mutual agreement among individual measurements of the same thing made under prescribed, like conditions.

8.1.7 Measures of Precision

Measurements which relate to the variation among the test results themselves, i.e., the scatter or dispersion of a series of test results, without assumption of any prior information.

The following measures apply:

(a) Standard Deviation ( ). The square root of the variance:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{i=n} (X_i - \bar{u})^2}{n}}$$

(b) Unbiased standard deviation, estimate of universe(s):

$$s = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \bar{X})^2}{n - 1}}$$

(c) Coefficient of variance (V). The ratio of the standard deviation of a set of numbers, n, to their average, X, expressed as a percentage:

$$V = \frac{s}{\bar{X}}$$

(d) Range. The difference between the largest and smallest values in a set.

(e) 95 Percent Confidence Limits. The interval within which one estimates a given population parameter to lie, 95 percent of the time.

8.1.8 Completeness

A measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions.

8.1.9 Representativeness

The degree to which data accurately and precisely represents a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition.

8.1.10 Comparability

The confidence with which one data set can be compared to another.

8.2 FIELDWORK

8.2.1 Sampling

Field sampling consists of a single collection cycle in the field for subsequent chemical analysis in an analytical laboratory. There is no opportunity to make routine assessments of accuracy, precision, or completeness in the course of the field sampling.

8.2.2 Blank Samples

The assessment of field sampling for accuracy will require the inclusion of trip blanks and field blanks. The blanks will contribute to accuracy of identification by checking for compounds inadvertently introduced into the samples during shipment or from contaminated sampling equipment.

8.2.3 Duplicate Samples

The assessment of precision for Field Sampling and Laboratory Analysis shall consist in taking duplicate samples. The duplicate sample will contribute to the increased confidence in the identification of sample constituents and can be used as a baseline in checking for compounds inadvertently introduced into the samples during shipment.

8.3 LABORATORY ANALYSIS

Data regarding the precision, accuracy, and completeness of data are made by the analytical laboratories. The methods for making these assessments shall be prescribed in the Standard Operating Procedures of the laboratories. These procedures will specify the processing of blanks, replicates, and spikes. Surrogate standards are used with each sample processed by gas chromatograph/mass spectrograph. Additionally, the analytical laboratory will monitor their quality control data to ensure that it is within the established control limits for the methods, as published by EPA.

8.3.1 Procedures Used to Assess Data Precision, Accuracy, and Completeness

Data accuracy and precision will be assessed for each sample lot using samples spiked at a known level. The percent recovery (R) will be calculated by acceptable EPA methods.

8.4 REVIEW OF DATA

When sample analysis data are received from the analytical laboratory they will be reviewed, and the accuracy and precision achieved will be compared to the control limits established by EPA.

9.0 INTERNAL QUALITY CONTROL CHECKS

9.1 QUALITY CONTROL CHECKS

Quality Assurance auditors will be responsible for ensuring that regular internal quality control checks are conducted on the generation of analytical data. These checks will include usage of the following:

- o Possession and use of the latest approved procedure(s), standards and/or project specific instruction(s);
- o Conformance with appropriate procedures, standards and instructions;
- o Thoroughness of the performance; and
- o Identification and completeness of paperwork generated during performance to include;
  - Project number and/or name
  - Task description
  - Name of performer
  - Date(s) of performance
  - Page number and total number of pages, if more than one sheet, all blank titled spaces of forms have been considered, and total presentation is legible and reproducible
  - Data entries, calculations and results are within scope of reason
  - Plots, charts, data summaries, graphs, etc., are precise, and parameters are clearly defined
  - Input data has been approved for use by original department, has been accurately transcribed, and is properly referenced.

9.2 ACCEPTANCE CRITERIA

The following acceptance criteria shall be considered if pertinent to the specific activity:

- o Appropriate forms, logs, or formats have been utilized;
- o Equipment utilized has been referenced and calibrated as required; and
- o Equipment utilized meets specifications.

Other acceptance criteria are incorporated into the technical procedures which describe the performance and documentation of a specific activity.

9.3 ACCEPTANCE DOCUMENTATION

The checker shall indicate his acceptance of the work performance and resultant paperwork by signing (or initialing) and dating the appropriate form or space provided.

Differences between the checker(s) and work performer(s) shall be discussed and resolved. If agreement cannot be reached, the differences shall be brought to the attention of succeeding higher levels of management until resolution is achieved.

9.4 CHECK FREQUENCY

Undocumented checks (surveillance) may be performed, as assigned, during the activity.

A check of documentation shall be performed at the completion of the task.

9.5 DOCUMENTATION

The checking function shall be documented on material generated in compliance with the applicable procedures for the specific task and retained for record purposes until job completion.

9.6 ANALYTICAL LABORATORY

The internal quality control procedures shall be described in operations procedures manuals of the analytical laboratories.

9.7 FIELD SAMPLING

9.7.1 Procedure

The methods for sampling, sample preservation, the taking of blanks, duplicate and spike samples shall be established in the FSP.

9.7.2 Corrective Action

If field sampling procedures are inadequate, corrective action shall be taken to ensure that proper, approved procedures are implemented. If samples have been collected, these samples may be discarded and new samples taken. If samples have been sent for analysis, the laboratory may be contacted to terminate analysis.

9.7.3 Contamination

If sample results indicate unacceptable contamination of field or trip blanks, sampling and analysis may be performed again. This decision will be made by the Ebasco Quality Assurance Manager after consultation with the NYSDEC representative.

10.0 PERFORMANCE AND SYSTEM AUDITS

10.1 PURPOSE

Performance and system audits shall be conducted to assure that field sampling, analytical procedures, chain-of-custodies, and sample documentation are conducted according to FSP.

10.2 SYSTEM AUDITS

Systems will be audited as a minimum, once during activities which may affect the integrity of the sample program. For sampling activities which continue for more than a four week duration, a second audit shall be performed.

10.2.1 Analytical Laboratories

The Ebasco QA Manager shall audit the analytical laboratory. System audits shall also be performed by the analytical laboratory, as described in the Operations Procedures Manual of the laboratory.

10.2.2 Field Sampling

Prior to the start of field activities, or shortly after systems are operational, the Quality Assurance Manager or designee shall conduct a system audit covering the following:

- Organization and responsibilities in order to determine whether the quality assurance organization is operational;
- The collection of samples to assure that written procedures are available and are being followed;
- Chain-of-Custody program to assure that the appropriate steps have been followed in the traceability of sample origin;
- The implementation of the operational procedures to assure that the appropriate QC checks are being made in the field and records are maintained of these checks;
- Determine whether the specified equipment is available, calibrated, and in proper working order;
- Training to assure that sampling crews are adequately trained;
- Records to assure that recordkeeping procedures are operational, and that field notebooks, logsheets, bench sheets, and tracking forms are properly prepared and maintained; and

- o Corrective action to verify that the appropriate chain of command is followed in responding to variances.

10.3 PERFORMANCE AUDITS

Audits shall be performed by the analytical laboratory as described in the Operations Procedures Manuals of the laboratory.

10.4 RESOLUTION OF DISCREPANCIES

If there are any discrepancies, deficiencies or indeterminate results, the individual performing the audit shall take the necessary action to require appropriate corrective actions are taken and assure that such corrective actions are completed prior to documenting acceptance of the services performed. If resolution cannot be reached, work shall be stopped by the individual performing the audit and the problems shall be brought to the attention of the Project Manager or delegated representative, to attain resolution.

The Project Manager or delegated representative shall evaluate the problems, provide solutions and verify implementation of solutions prior to allowing the activity to resume.

10.5 REVIEW OF SUBCONTRACTOR PROCEDURES

Procedures governing the compliance of subcontractors to the Ebasco Quality Assurance Program shall be submitted to Ebasco for review prior to the start of field sampling. The subcontractor's procedures are reviewed for consistency with the project requirements. The procedures are submitted to the Quality Assurance Manager who is responsible for assuring that the procedures are sufficiently detailed to permit the start of work or revised, as necessary, to the satisfaction of Ebasco.

11.0 CORRECTIVE ACTION

11.1 NONCONFORMANCE REPORT

The Ebasco Quality Assurance Manager or his designee shall issue nonconformance reports for each nonconforming condition identified (i.e., when objectives for precision, accuracy, completeness, representativeness or comparability are not satisfied, or when unacceptable procedural practices or conditions are identified).

The nonconformance report shall: fully describe the conditions requiring corrective action, shall indicate the nature of the corrections required, and shall specify a schedule for compliance. The final authority for issuance of the report rests with the Quality Assurance Manager who shall notify the Project Manager.

11.2 CORRECTIVE ACTION

The report shall request the responsible individual to indicate in writing the nature of the corrective action taken, and shall require appropriate documentation of such action. The corrective action taken shall include measures to preclude a repetition of the original deficiency. After the response has been reviewed and the corrective action taken is acceptable, the Quality Assurance Manager shall inform the involved parties that the nonconformance has been satisfactorily resolved.

11.3 STOP-WORK ORDER

If corrective actions are insufficient, or resolution cannot be reached, or results of prior work are indeterminate, work may be stopped by a Stop-Work Order. The Stop-Work Order can only be authorized by the Project Manager or Quality Assurance Manager in writing. If there is a disagreement between the Quality Assurance Manager and the Project Manager, the differences shall be brought to the attention of succeeding levels of management until resolution is achieved.

11.4 STOP-WORK CORRECTIVE ACTION

The conditions for which the Stop-Work Order was issued shall be described in sufficient detail to allow proper evaluation of the problems and to effect proper corrective action. Documentation of discussions, telecons, or correspondence which describe the actions taken to evaluate the problems, provide solutions, and verify implementation of solutions shall be attached to the Stop-Work Order and fully referenced in the appropriate spaces. Work shall not continue until the Stop-Work Order has been rescinded by the individual that authorized the stop work.

11.5 CAUSE AND ACTION TO PREVENT RECURRENCE

The Ebasco Quality Assurance Manager shall track nonconforming conditions, analyze the corrective actions required, and take the necessary steps to resolve the causes of the nonconforming conditions in order to prevent recurrence.

11.6 FIELD CHANGES

The Project Manager or his designee is responsible for all site activities. In this role, the Project Manager is required at times to adjust the site programs to accommodate site specific needs. When it becomes necessary to modify a program, the responsible activity supervisor shall notify the Project Manager of the anticipated change and implement the necessary changes. When a change is determined to be necessary, a written notification shall be submitted by the initiator of the change and a copy shall be attached to the file copy of the affected document. If unacceptable, the action taken during the period of deviation shall be evaluated in order to determine the significance of any departure from established program practices and action taken.

The changes in the program shall be documented on a field change request which is signed by the initiator and Project Manager. A typical Field Change Request (FCR) Form is utilized to document field changes. Field changes shall be numbered serially beginning with one and maintained in a file at the job site by the Site Manager. The Site Manager shall be responsible for the controlling, tracking and implementation of the identified changes.

12.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

12.1 FREQUENCY

At periodic intervals established for the Project, the Quality Assurance Manager shall prepare and provide a quality assurance report to the Project Manager on the performance of the Quality Assurance Program for the project. Potential problems which arise between regular reporting periods may be identified to project management at any time.

12.2 CONTENTS

The reports to management shall contain:

- Results of all system and performance audits conducted during the period;
- An assessment of the accuracy of measurement data, precision, completeness, representativeness, and comparability;
- A listing of the nonconformance reports issued during the period, related corrective actions undertaken, and an assessment of the results to these actions; and
- Identification of significant quality assurance problems and recommended solutions.